VANDERBILT UNIVERSITY MEDICAL CENTER

Guideline: Adult Venous Thromboembolism Prophylaxis

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I. Purpose

To prevent pulmonary embolism (PE) and deep vein thrombosis (DVT) in burn patients

II. Risk Factors

General Risk Factors	High Risk Factors	Very High Risk Factors
• Burn 10-19% TBSA • Age > 40 years • Central venous access • ISS > 9 • Blood transfusions • Surgical procedure within 72 hrs • Immobilization • Malignancy • Extensive soft tissue trauma • Hormone therapy • Obesity • AIS ≥ 3 (any region)	• Burn 20-39% TBSA • Inhalation injury • Age > 60 years • ISS > 15 • GCS < 9 for > 4 hours • Major venous injury/repair • PMH of venous thromboembolism (VTE) • Lower extremity fracture • Multiple spinal fractures • Pregnancy	• Burn ≥40% TBSA • Spinal cord injury with paraplegia or quadriplegia • Complex or multiple (≥2) lower extremity fractures • Major pelvic fracture • Multiple (≥ 3) long bone fractures (≥ 1 in the lower extremity) • Age ≥75 years with any high risk factor) • COVID-19 positive

III. Physical Exam Findings

A. PE – tachycardia, tachypnea, decreased oxygen saturation, altered mental status, diaphoresis
B. DVT – extremity pain, fever, localized edema/swelling, erythema

IV. Lab and Radiology Findings

A. Blood gas – respiratory alkalosis, hypoxemia
B. CXR – nonspecific, peripheral wedge defect
C. Extremity duplex- occlusive/non-occlusive thrombosis
D. CT angio chest – filling defect(s)

V. Pharmacologic Prophylaxis Guideline

A. All patients, unless otherwise specified, should receive VTE prophylaxis with weight-based enoxaparin (Lovenox) upon admission.

Patient Dry Weight	Initial Enoxaparin Dose	Routine LMWH Monitoring
< 50 kg	30 mg q 12h	Yes
50 – 89 kg	30 mg q 12h	No
90 – 129 kg	40 mg q 12h	Yes
130 – 179 kg	60 mg q 12h	Yes
≥ 180 kg	80 mg q 12 h	Yes

B. Enoxaparin should be ordered via the burn admission order set or via the burn enoxaparin order set (labeled enoxaparin- ADULT BURN USE ONLY) with doses scheduled at 0600/1800

C. Pharmacologic VTE prophylaxis should be NOT be held for elevated baseline INR due to liver dysfunction.

D. No doses of VTE prophylaxis will be held for operative procedures unless requested by the operating attending.

   a. Patients receiving prophylactic enoxaparin doses of 60 mg or 80 mg should instead receive enoxaparin 40 mg for two doses prior to and one dose following the operative procedure and then return to the previous dosing regimen.

VI. Exceptions to VTE Prophylaxis Guideline

A. Renal impairment- significant rise in SCr (≥50%), CrCl <30 mL/min or receiving renal replacement therapy.

   i. Normal weight- renally dosed enoxaparin (40 mg once daily) or switch to subcutaneous heparin 5000 units q 8 hours.

   ii. Obese patients (BMI 40 kg/m$^{2)}$ AND no epidural catheter or paravertebral block in place, switch to subcutaneous heparin 7500 units q 8 hours.

   iii. Weight < 50 kg- renally dosed enoxaparin (30 mg once daily) or switch to subcutaneous heparin q 12 hours.

B. Epidural or Paravertebral Block Placement

   i. Enoxaparin will not be used 12 hours prior to epidural or paravertebral block placement, while the catheter is indwelling, or for 4 hours after removal.

   ii. Heparin 5000 units q 8 hours and SCDs should be utilized

C. History of heparin induced thrombocytopenia (HIT)

   i. Fondaparinux 2.5 mg subcutaneously q24 hours (only if CrCl >30 mL/min and not receiving neuraxial anesthesia) or apixaban 2.5 mg BID (must discuss with operating surgeon)

VII. Routine Monitoring

A. A low molecular weight heparin (LMWH) level (Anti-Xa level) should be drawn for all patients with the following characteristic

   i. Burn ≥ 20% TBSA

ii. Weight < 50kg or ≥ 90 kg
iii. Spinal cord injury with paraplegia, quadriplegia
iv. Patients with concomitant trauma per trauma division guideline

B. LMWH level peaks should be drawn 4 hours after at least 3 doses of enoxaparin
   i. If levels are drawn early or late, the level is not a true peak and cannot be used to adjust enoxaparin doses
   ii. Goal peak is 0.2 to 0.4 IU/mL
      - If level below goal range, increase dose to the next enoxaparin syringe size
      - If level above goal range, decrease dose to the next syringe size
         - If already receiving enoxaparin 30 mg q 12 hours, decrease to 30 mg q 24 hours
         - If LMWH level remains above goal range despite decreasing to q 24 hour dosing, change to subcutaneous heparin.
   iii. Repeat LMWH levels should be checked every 2 weeks (or sooner if renal function declines and/or there is concern for bleeding).
      - Many patients may require lower enoxaparin doses as burn wounds heal.
   iv. If assistance with interpreting LMWH levels and/or dosing enoxaparin is needed, please contact the burn pharmacist.

VIII. IVC Filter Placement

A. A prophylactic IVC filter may be considered in high risk burn patients with a contraindication, failure, or complication related to anticoagulation.
B. Indications for a therapeutic IVC filter include known PE or lower extremity DVT and a contraindication, failure, or complication of anticoagulation (not a complete listing).
C. Placement of IVC filter does not prevent PEs but prevents large clots from traveling to lower extremities. Once patients stabilize, they will still require anticoagulation as long as the filter is in place.

IX. References

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